

Appl. No. 10/713,178

Amdt. Dated November 23, 2005

Reply to Office Action of September 1, 2005

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the above-identified application:

Claim 1 (currently amended): A hand-held laser fusion welding assembly for treating a workpiece, comprising:

a main body dimensioned to be grasped by a hand and adapted to couple to at least a laser delivery system;

a nozzle coupled to the main body and having an aperture through which laser light from the laser delivery system may pass; and

a laser reflection shield coupled to, and at least partially surrounding, either the nozzle or the main body, the laser reflection shield constructed at least partially of a material that reflects at least a portion of the laser light that passes through the nozzle aperture and is reflected by the workpiece, and configured such that no section thereof surrounds any portion of the laser light once the laser light passes through the aperture.

Claim 2 (original): The assembly of Claim 1, wherein the laser reflection shield is configured to be movable on, and removable from, the main body and nozzle.

Claim 3 (original): The assembly of Claim 1, wherein:

the reflected laser light is characterized by at least a wavelength; and

the material of which the laser reflection shield is at least partially constructed has low absorption characteristics at the reflected laser light wavelength.

Claim 4 (original): The assembly of Claim 1, wherein the laser reflection shield is configured and constructed to diffusely reflect the laser light reflected by the workpiece.

Claim 5 (original): The assembly of Claim 1, wherein the laser reflection shield comprises:

a clamp having at least a front side and a back side; and

Appl. No. 10/713,178

Amdt. Dated November 23, 2005

Reply to Office Action of September 1, 2005

a shield plate coupled to clamp front side.

Claim 6 (original): The assembly of Claim 5, further comprising:

a plurality of clamps from which the clamp is selected; and

a plurality of shield plates from which the shield plate that is coupled to the clamp front side is selected.

Claim 7 (original): The assembly of Claim 5, wherein:

the clamp front side has a recess formed therein; and

the shield plate is disposed at least partially within the recess.

Claim 8 (original): The assembly of Claim 5, wherein the clamp is an annulus having an inner peripheral surface and an outer peripheral surface, each peripheral surface disposed between the clamp front and back sides.

Claim 9 (currently amended): The assembly of Claim 8, wherein the annulus includes a first end and a second end disposed adjacent one another, and wherein the clamp further comprises:

an adjustable fastener coupled to the clamp, the adjustable fastener configured to move the first and second ends relative to one another.

Claim 10 (original): The assembly of Claim 9, wherein the adjustable fastener comprises a threaded fastener that extends through the annulus outer peripheral surface, through the annulus first end, and at least partially into the second end.

Claim 11 (original): The assembly of Claim 5, further comprising:

a plurality of threaded openings formed in the clamp front side;

a plurality of openings extending through the shield plate, each shield plate opening collocated with one of the threaded openings; and

a plurality of threaded fasteners, each fastener extending through one of the shield plate openings and into one of the threaded openings.

Appl. No. 10/713,178

Amdt. Dated November 23, 2005

Reply to Office Action of September 1, 2005

Claim 12 (original): The assembly of Claim 1, further comprising:

one or more proximity sensors coupled to the laser reflection shield, each proximity sensor configured to sense a proximity of the laser reflection shield to the workpiece and operable, in response thereto, to supply proximity signals representative thereof.

Claim 13 (original): The assembly of Claim 12, further comprising:

one or more sensor apertures formed through the reflection shield, wherein each proximity sensor is mounted proximate one of the reflections shield sensor apertures.

Claim 14 (original): The assembly of Claim 12, further comprising:

a control circuit coupled between each proximity sensor and the laser delivery system, the control circuit coupled to receive proximity signals and operable, in response thereto, to selectively allow or prevent laser light delivery from the laser delivery system.

Claim 15 (currently amended): A laser reflection shield for reflecting laser light, comprising:

a clamp adapted to mount on a hand-held laser welding wand, the clamp having at least a front side and a back side and selectable from a plurality of differently shaped clamps; and

a shield plate coupled to the clamp front side, the shield plate constructed at least partially of a material that reflects at least a portion of the laser light and selectable from a plurality of shield plates.

Claim 16 (original): The shield of Claim 15, wherein:

the laser light is characterized by at least a wavelength; and

the material of which the shield plate is at least partially constructed has low absorption characteristics at the laser light wavelength.

Appl. No. 10/713,178

Amdt. Dated November 23, 2005

Reply to Office Action of September 1, 2005

Claim 17 (original): The shield of Claim 15, wherein the shield plate is configured and constructed to diffusely reflect the laser light.

Claim 18 (canceled).

Claim 19 (original): The shield of Claim 15, wherein:

the clamp front side has a recess formed therein; and

the shield plate is disposed at least partially within the recess.

Claim 20 (original): The shield of Claim 19, wherein the clamp is an annulus having an inner peripheral surface and an outer peripheral surface, each peripheral surface disposed between the clamp front and back sides.

Claim 21 (original): The shield of Claim 20, wherein the annulus includes a first end and a second end disposed adjacent one another, and wherein the clamp further comprises:

an adjustable fastener coupled to the clamp, the adjustable fastener configured to move the first and second ends relative to one another.

Claim 22 (original): The shield of Claim 21, wherein the adjustable fastener comprises a threaded fastener that extends through the annulus outer peripheral surface, through the annulus first end, and at least partially into the second end.

Claim 23 (original): The shield of Claim 15, further comprising:

a plurality of threaded openings formed in the clamp front side;

a plurality of openings extending through the shield plate, each shield plate opening collocated with one of the threaded openings; and

a plurality of threaded fasteners, each fastener extending through one of the shield plate openings and into one of the threaded openings.

Appl. No. 10/713,178

Amdt. Dated November 23, 2005

Reply to Office Action of September 1, 2005

Claim 24 (original): The shield of Claim 15, further comprising:

one or more proximity sensors coupled to the laser reflection shield, each proximity sensor configured to sense a proximity of the laser reflection shield to a workpiece and operable, in response thereto, to supply proximity signals representative thereof.

Claim 25 (original): The shield of Claim 24, further comprising:

one or more sensor apertures formed through the reflection shield, wherein each proximity sensor is mounted proximate one of the reflections shield sensor apertures.

Claim 26 (new): A hand-held laser fusion welding assembly for treating a workpiece, comprising:

a main body dimensioned to be grasped by a hand and adapted to couple to at least a laser delivery system;

a nozzle coupled to the main body and having an aperture through which laser light from the laser delivery system may pass;

a laser reflection shield coupled to, and at least partially surrounding, either the nozzle or the main body, the laser reflection shield constructed at least partially of a material that reflects at least a portion of the laser light that passes through the nozzle aperture and is reflected by the workpiece; and

one or more proximity sensors coupled to the laser reflection shield, each proximity sensor configured to sense a proximity of the laser reflection shield to the workpiece and operable, in response thereto, to supply proximity signals representative thereof.